Worldwide converging developments in distance education

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The growing acceptance of distance education

From a global point of view, distance education in the 21st century has many faces. There are examples of the exchange by post of typewritten instructions by teachers and filled handwritten assignments by students. At the other hand there are examples of the exclusive delivery of learning materials by internet and the corresponding use of electronic devices by students. However, converging tendencies can be noticed, which go together with the growing acceptance worldwide of distance education as a part of the educational infrastructure (Rosenberg, 2000). The growing appeal to distance education results from the before unknown growing demand in higher education and the consequent challenge of massification (Altbach, Reisberg, & Rumbley, 2009). Only, from 2000 until 2010, the number of students is increased from 100 to 150 million, worldwide. At the beginning of the 20th century, the total amount of students was half a million (Guri-Rosenblit, Šebková, & Teichler, 2007) There is a huge potential for further growth. In the United States about 50% of the age cohorts between 20 – 30 years have higher education against 5% in Africa. The world average is 20%. In wealthy and in emerging countries as well, governments are unable to invest in higher education accordingly. This puts a pressure on quality and a shift from education as a public to a private good, resulting in a fast increase of private higher education (now already 30% worldwide). Against this background, a greater role for distance education seems inevitable and in the past decades unprecedented growth in number and enrolments of mega-universities has taken place. For instance, Indira Ghandi University has more than 2 million students.

Distance education makes available education in dense populated areas and it enables continued learning for adults, who cannot afford to spoil time in classrooms. Distance education is delivering education in the students' home or in any other place they want. At the same time, distance education has the potentiality to connect people from all over the world in one virtual classroom. (Schuetze & Slowey, 2000).

Converging standards for quality in education

However, the growing acceptance of distance education requires that the same quality standards are applied likewise in f2f and distance education (Mehrotra, Hollister, & MacGahey, 2001). Recently, a couple of meta-analysis has scrutinized thousands of theoretical and empirical studies. They came up with seven characteristics, which for reasons of brevity are compressed in four. The quality of education is better if it promotes:

- 1. Active learning and high expectations
- 2. Frequent and timely interaction between students and teacher

- 3. Co-operation between students
- 4. Personalization (Chickering & Gamson, 1987)

Active learning literally means that education is challenging. The transmission of information, as often happens in lectures is not. Assignments that ask students to look for theoretical and practical information themselves generally are.

The intensity of the interaction between students and teachers is the second criterion for quality. Delivery of feedback is one of the best contributions of teachers to students' learning. The creation of psychological safety is another. Agreements with respect to the timely delivery of assignments and feedback must be kept.

The third characteristic is cooperation between students. Especially, in case of adult learners, fellow students represent complementary perspectives, experiences, tacit knowledge, and values. Helping each others and building teams are indispensable in the knowledge economy.

The last one is the possibility for students to satisfy their own interest and look for the newest scientific insights and literature. In addition, modest freedom for students to comply with their learning preferences and to plan their own study will improve learning outcomes

Interactivity and connectivity

These characteristics have in common a high degree of interactivity between students, teachers, resources, and the outside world. The fundamental question is, whether a high degree of interactivity can also be achieved in distance education. Many still think about distance education, as the lonely student in the silent study behind his or her books.

The paper will elaborate that owing to the growing availability of IT-support in distance education a high degree of interactivity between students, teachers and the outside world becomes attainable. Consequently, distance education can comply with current quality requirements (Barsky, Clements, Ravn, & Smith, 2008; Maier & Warren, 2000; Rosenberg, 2000). Only in case of the availability of digital devices, mega universities will be able to scale the availability of (higher) education and to compete with the other institutions for higher education (Young, Perraton, Jenkins, & Dodds, 1980). IT is able to compensate three shortcomings of distance teaching universities over campus universities (Guri-Rosenblit, 2010):

- 1. To overcome the isolated position of students
- 2. Making available libraries and other information
- 3. More frequent updates of self-study materials.

A clear policy with regards to the use of IT and adjustment between the de different technologies and providers are even more important than the availability of infrastructure (Cobcroft, Towers, Smith, & Bruns, 2006).

The significance of the role of mega-universities in the deliverance of higher education is the result from their industrial production strategy, compared with the idea of craft and personal commitment between a professor and a student (Schlusmans, Koper, & Giesbertz, 2004.).

Campus universities are based upon the craftsmanship of professors. The degree of task differentiation is low. The same faculty writes learning materials, delivers lectures, supervises students and takes exams. Mega distance teaching universities are characterized by an industry-like task differentiation. Courses are developed in interdisciplinary teams of professors, educational technologists and media designers. Trained supervisors are responsible for the supervision of students and examination takes place in specialized assessment centres. Under conditions like these, scaling to a mega university is possible, because of the limited number of highly trained professors who are needed. The training of the other faculty is much easier (Guri-Rosenblit et al., 2007).

At a global level, it is the combination of distance learning and e-learning that is promising. E-learning includes "a wide set of applications and processes, including computer-based learning, Web-based learning, virtual classrooms and digital collaboration. We define e-learning as the delivery of content [and interaction] via all electronic media, including the Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV, and CD-ROM" (Urdan & Weggen, 2000).

Global differences

The potential contribution of IT support to quality (distance) education is beyond reach from many parts of the world: "Capacity for implementation (of IT) often appears to be inversely proportional to the perceived needs (Altbach et al., 2009). Urban areas, where admittance to regular universities is relatively good have benefited from World Bank investments in IT in Africa and South America.

The 21st century shows a growing digital divide between and within rich and poor countries. In the Netherlands, about 80% of the whole population has a fast internet connection. In Africa, in average 5% of the population is able to use a (mostly) slow internet connection.

Apart from the availability, the costs of connectivity differ also worldwide. A recent publication reveals a map of regional differences in the "ICT Price Basket" (International Telecommunication Union, 2010). These are the costs a combination of fixed telephone-, cellular phone- and fixed internet access costs as a percentage of the Gross National Income (GNI) per capita of a country. Or in other words: the percentage that an average inhabitant is spending on ICT (Figure 1).

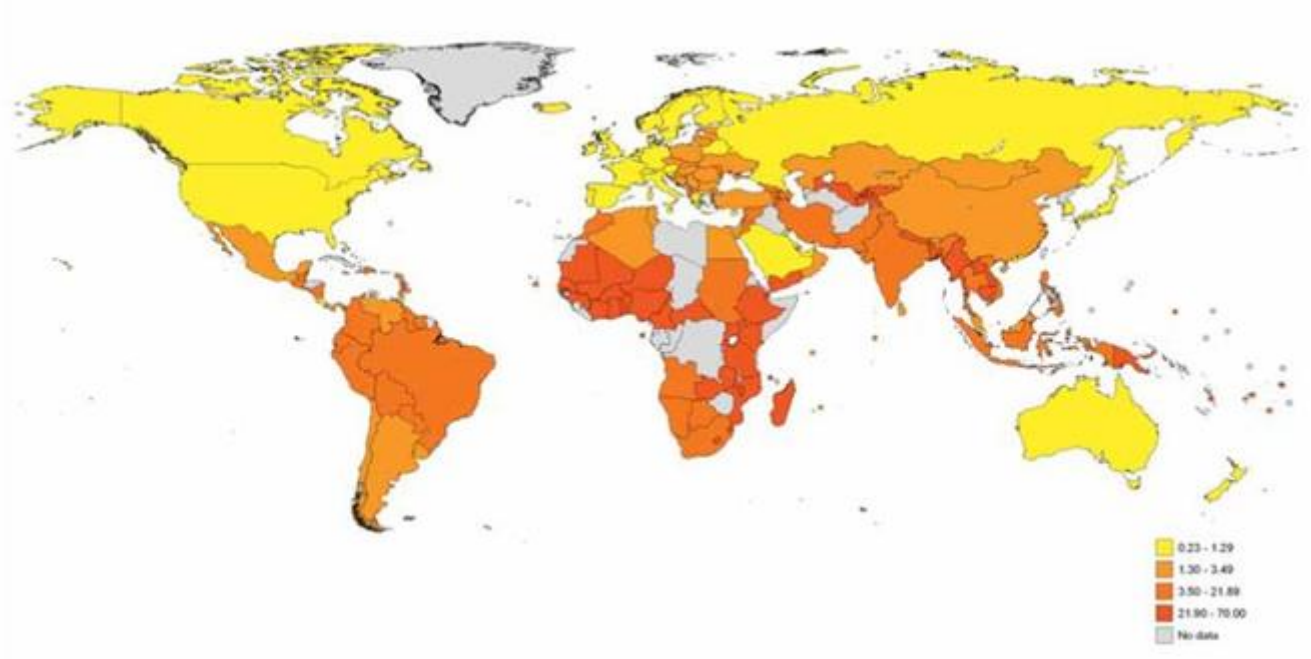

Figure 1 ICT Price Basket

Several authors are denouncing the investments in ICT-enhanced learning in urban areas as the campus universities already are concentrated in the same areas (Day, 2005) In the late nineties the African Virtual University (AVU) emerged from a World Bank project under which video-conferencing centers, connected through satellite, were established throughout sub-Saharan Africa, mostly in already existent university campuses. Nevertheless, AVU has contributed significantly to the increase of the quality and the availability of higher education in Africa.

Most mega universities have relied on rather traditional modes of delivery of materials, like printed materials, television, and radio (Gulati, 2008; Gunga & Ricketts, 2007; Sife, Lwoga, & Sanga, 2007). However, to compete with campus universities they feel challenged to increase the interactivity between students and professors. In emerging countries, the availability of computers especially in rural areas is limited. Even study centres that have a few computers have to cope with problems as irregular supply of electricity, limited possibilities of repair and theft. In addition, the main use of PC's in education is e-mail and the internet. Electronic learning management systems and Learning management systems are virtually non-existent (Unwin, 2008).

New opportunities seem to come from an unexpected direction. In emerging countries, the use of mobile technology as an alternative for computers and the internet is explored and promoted. Proponents consider the use of mobile technology as a possibility to introduce Education 3.0. with its ample communication and personalization possibilities as an alternative for the lack of computers (Keats & Schmidt, 2007). The use of mobile phones is evident given the fact that in Africa, Latin America and Asia 2,2 billion mobile phones are in use. In Africa only, the number of people who has a mobile phone availability in increasing by 60% each year (Kumar et al., 2010). Consequently, a fast growing number of M-learning

applications can be witnessed (Brown, 2002). Mobile phones were used to increase language proficiency as an extra-curricular activity and as a tool for education in mathematics. An application was developed that enables students to listen to Wikipedia content (Ford & Botha, 2007; Kumar et al., 2010). In experiments like these, children were provided with free mobile phones. M-learning might be promising, it still costs a lot of money. Average mobile cellular costs vary between 1.1% of GNI in Europe, to 16.7 in Africa ('regular' mobile phones, not broadband). Also, differences in prices are large. In Costa Rica, monthly cellular costs are 0.46% of GNI, as compared to 69% of GNI for citizens in Myanmar. However, mobile phone costs are coming down rapidly, especially in developing countries.

Taking into consideration the price, it is not surprising that the number of M-learning application in western countries outnumbers the applications that are applicable in emerging countries. In western countries, mobile connectivity is nearly total and telephones and other mobile devices are very advanced. Reviews of mobile learning projects however demonstrate dominance of the delivery of content and teacher control. Strangely enough the communication aspect is underdeveloped (we are talking about mobile phones!) (Frohberg, Göth, & Schwabe, 2009; Kukulska-Hulme, Sharples, Milrad, Arnedillo-S´anchez, & Vavoula, 2009). The authors conclude that the contribution of mobile learning to the increase of interactivity between students and teachers and students and students is only at its beginning. In experiments in Africa, the communication aspect seems to be more important (Ford & Botha, 2007). Others give an account of the extensive use of SMS-technology for educational purposes (Traxler & Leach, 2006)

The nearly general availability of fast internet connections, high performance computers and smart phones in Western countries enables a high degree of interaction between teachers, students and resources. One might even observe that the open and distance teaching universities do not use the full range of opportunities.

The Open University in the Netherlands has been involved in e-learning projects in African countries like Tanzania, Ghana, and Zambia. We had to rely on internet cafés with slow connections by phone and virtually no possibilities for printing. Together with local institutions we have developed low tech devices in order to improve interactivity. We felt that the use of these low-tech devices contributed to improve education because we always kept in mind the four criteria for quality in education.

Enhancing quality in distance education with the help of low tech and high tech devices

The second part of this paper describes approaches that use both high tech and low tech IT support in order to comply with each of the four criteria for quality education under conditions. These approaches are based partly at literature, at experiences that were collected during some field experiments in which the Open University in the Netherlands has been involved, and some of them are no less or more then conjectures. What is needed in the fist place are educational designers who are willing to create viable educational approaches that can be used to implement quality education under conditions of low-tech IT support and governments who choose in favour of a large scale diffusion of low-tech IT support in stead of prestigious IT show-case projects (Altbach et al., 2009; Njenga & Fourie, 2010). In this

way, in emerging countries the availability of education with basic quality can be increased significantly with the help of distance education (Anderson, 2007; Marshall, 2007).

In order to improve overview, the second part of this paper will consist of four sections that are written in two columns. The sections cover each of the four quality criteria, the columns the low versus high tech condition.

Active learning

Low-tech	High-tech
Active learning is based on a balanced delivery of content and assignments that support students to apply the content in their own life or in cases. Radio, television still are major tools in the distribution of content (Gulati, 2008; Leary & Berge, 2007). Among others, the African Virtual University distributes videotapes and CD's with lectures. These lectures could be accompanied by assignments in students' home environment and by background information in the absence of books. Even in the most remote villages, equipment to watch CD's – normally no educational ones – is in place. CD's have one major advantage over ratio and television; they can be used during periods when electricity is available! Mobile technology offers new tools. Quite a number of experiments have taken place with tutorials where students receive automated feedback by mobile telephones (Brown, 2002; Kumar et al., 2010). Mobile phones are also in use for the delivery of short instruction and material of a limited size (Traxler & Leach, 2006) 'Cross roads café' is an interactive language course developed by the African Virtual University that is meant to be used in internet cafés.	In comparison with low-tech support, high-tech IT-support offers ample opportunities for active learning. Assignments are delivered in addition to the delivery of all types of materials (varying from written texts to audio and video fragments) and as soon students have produced the proper answers to these assignments, they can be submitted. E-learning in f2f and in distance teaching conditions enable teachers to automate the delivery of instruction and the transmission of information and reserve time for other purposes. Students are enabled to store their papers in an electronic portfolio that allows teachers to watch the progress and to judge whether students have coped with earlier feedback in a proper way.

Frequent contacts between students and teacher

Low-tech	High-tech
One of the best applications of M-learning is the submission by students of results of their assignment by mobile telephone (Brown, 2002). Mostly, the messages of students will be gathered in a mailbox and teachers can edit their commentary in messages for different group of students, based upon common mistakes or failures (Visser & West, 2005). Feedback to students is possible also in educative radio broadcasts. In order to prepare feedback, teachers will listen to a selection of the submitted answers. Using an internet café is in some occasions an alternative for delivery of feedback by mobile phone. Using a computer allows students to submit more elaborate assignments, but the availability of internet cafés in rural areas is limited.	Bulletin boards and discussion lists offer extensive possibilities for students and teachers to interact in an asynchronous way. These devices are in particular useful if the interaction between students is valued in the same way as the interaction between students and teachers. In case of synchronic communication, it is possible to create virtual classrooms, where up to 10 people or more can talk and see each other's. Albeit visual communication within larger groups then five persons still challenges the available bandwidth. In a virtual classroom, students can defend their assignments and the teacher immediately comments upon it. In addition, the virtual classroom offers superb conditions for project work, supervision, and doing research.

Co-operation between students

Low-tech	High-tech
In the first place, co-operation starts to stimulate collaboration between students in the same place. Collaboration of this type is limited often by the fear of free rider behaviour. However, a balanced approach is characterized by the alteration of individual and group assignments. Collaboration between students from different places benefits highly from the use of mobile phones. Especially, if students are supposed to collaboratively create knowledge by solving problems in their own environment, they will benefit from incidental conversations by telephone (Keats & Schmidt, 2007) Whether students communicate by forum, mail of phone, this process is improved significantly by the opportunity to see each others in study centres every now and then in order to have more in-depth conversations. African Virtual University has invested in the creation of study centres, although the number of study centres stays significantly behind the growing demand. Unfortunately, they are struggling with their 'business model' after World Bank funding ended.	At the high-tech side, the internet, and in particular Web 2.0 applications provide ample new opportunities for collaborative work. Social sites, like Linked-In and Face book offer uncountable opportunities to participate in communities. They allow students to share resources for projects and other collaborative products. Sites like Delicious or Diigo will support social book marking. At the same time, students in developed countries have ample opportunities to meet 'life' and consequently, the use of videoconferencing, skype stays behind the expectations. Meeting people is much more then the exchange of messages. Drinking together a cup of coffee or a glass of beer in the full experience of visual expression and body language often makes the difference.

Personalization

Low-tech	High-tech
Especially in adult learning, personalization of content and learning matter is a prerequisite for the growth of relevant competences. In emerging countries were even books are scarce, personalization seems beyond reach. The African Virtual University is developing a 'digital library' in which students will find manuals, study books and relevant articles. The number of computers and printers still is limited and therefore benefit for students is restricted (Guri-Rosenblit, 2010). Equally promising is an application for mobile phones that allows students to search in Wikipedia and subsequently to listen to the content ('audio wikipedia'). This application complies with the oral tradition in many African countries. Although these are isolated developments in an environment where education in the first place will be focussed at learning the basics.	High-tech learning support opens up nearly unlimited opportunities for individualizing students' study paths. The Open Educational Resource movement, in connection with facilities like Wikipedia, Wikiversity and, Wikibooks makes available a mass supply of content. University supported star-systems will support students to select quality sources. The main obstacle is not technology, but educational philosophy. Even at university the dominating focus is on predetermined study paths. Consequently students use handbooks that might be published recently but which content is based upon research from more than a decade ago. Making students more responsible for the search of their own content would not only be more motivating to many, but also could bring much more recent information into the classroom.

Summary

Worldwide, the availability of high tech learning support will grow very fast. At the same time, billons of people will have access only to elementary electronic learning support, if at any at all. Consequently, parallel to the exploration of high-tech learning support, the development, distribution and deployment of low-tech devices are necessary in order to deliver basic quality higher education in emerging countries to many students.

In making available higher education to many people in emerging countries distance education is a prerequisite. It is unfeasible to teach the required professors and to build the number of campuses that is necessary to satisfy the growing need for higher education in emerging countries. However, distance education will not meet the quality requirements that are associated with higher education without comprehensive use of electronic devices that enable interactivity between students, students and teachers and students and available resources.

This paper has contributed to answer the question how four major quality criteria can be met with the help of electronic devices. A distinction has been made between electronic devices that might be deployed at large scale in emerging countries and those devises which use is restrained to countries with a rich population. Three conclusions can be drawn. It will take decades before the availability of computers in emerging countries compares with rich countries, also because of the necessity to have a reliable supply of electricity and enough expertise to maintain the network. In the meantime mobile learning will be a growing substitute, especially in combination with an accessible network of study centres in the rural parts. In the third place a distance learning infra structure has to be developed that is characterized by an adequate mix of faculty (course developers, tutors and supporting staff) and that develops adequate didactic solutions to deploy the growing low-tech infrastructure.

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